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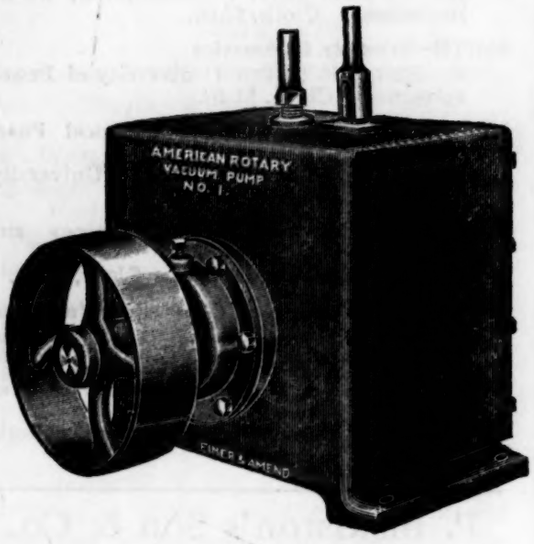

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CONTENTS

MSS. intended for publication and books, etc., intended for review should be sent to The Editor of Science, Garrison-on-Hudson, N. Y.

THE PUBLIC HEALTH WORK OF PROFESSOR SEDGWICK[1]

WILLIAM THOMPSON SEDGWICK, son of William and Anne Thompson Sedgwick, was born at West Hartford, Connecticut, December 29, 1855. His colonial ancestor was Robert Sedgwick, who settled in Boston in 1636. He studied at the Sheffield Scientific School, the Yale Medical School, and Johns Hopkins University. On his twenty-sixth birthday he married Mary Katrine Rice, at New Haven, Connecticut. In 1883 he came to Boston and the Massachusetts Institute of Technology, where for thirty-eight years he was professor of biology and public health. He died at Boston, January 25, 1921, at the age of sixty-five.

These simple facts tell who Professor Sedgwick was. But what he was and what his life meant to the people of Boston, to hundreds of young students, to the science of public health, and to the Commonwealth of Massachusetts can not yet be told or even estimated. His death is too recent and our thoughts are still so touched with sadness that one can not adequately picture his manifold activities or form a just appreciation of his life or his place in history. But in the various eulogies already written a few words stand out prominently and must be regarded as characteristic of the man. The words are service, public service, kindliness, serenity, inspiration, buoyant optimism, love of young men. Let these suffice. They are eulogy enough for any man.

I can not write about Professor Sedgwick's work in public health without saying more about my own relations to it than is becoming on such an occasion—but it is characteristic of his work that it was not done in the seclusion

[1] A memorial address delivered at Unity House, Boston, February 6, 1921, by Professor George C. Whipple, of Harvard University. Professor Sedgwick was to have spoken at this meeting on the subject of Child Welfare.

of his study and laboratory, but involved all those with whom he came in contact.

I first knew Professor Sedgwick when I was a student of engineering and he professor of biology at the Institute of Technology. He was thirty-three and I was twenty-two. For the first time (1888–89) he was giving a course of lectures in bacteriology to civil engineers. It was an innovation. Until then sanitary engineering had leaned for its support on chemistry, but here was a new science coming to its aid. I have in my study the notes which I took of Professor Sedgwick's weekly lectures. They began as follows: "The sanitarian needs a proper working theory." Then he proceeded to develop the germ theory of disease as he had learned it from Pasteur and other European scientists who were laying the foundations of that science which has done so much for the health of the world. He showed how physicians and engineers had been wrong, how they had groped in the dark, and how, by applying the recently discovered principles of biology, it was possible to give to sanitary engineering new life. Of course, Sedgwick was not the only American to take up with the new ideas. There was Dr. Welch at Johns Hopkins, Dr. Biggs in New York, and others who were doing the same thing. But these other men were in medical schools; Sedgwick was in the Institute of Technology where the engineering sciences predominated and therefore his influence on sanitary engineering was the greatest. Nor would it be right to ignore the work of his colleagues in chemistry, such as Professor William Ripley Nichols and Dr. Thomas M. Drown. It was the combination of chemistry and biology with engineering which made the profession of sanitary engineering what it is—a profession which we are proud to think has become more highly developed in America than in any other country.

It is important to keep in mind certain dates in connection with the work of these Massachusetts scientists. Louis Pasteur's pioneer work in bacteriology was done in the seventies. In 1876 Robert Koch discovered the germ of anthrax. In 1882 he suggested the use of solid culture media and thus made it possible to consider bacteria in a quantitative way. In 1880, Eberth found the bacillus of typhoid fever. In the same year Laveran had discovered the malarial parasite. In 1883–84 Klebs and Löffler found the germ of diphtheria. In 1883 Koch found the cholera spirillum. And it was in 1883 that Sedgwick undertook his work in Boston. No wonder that he saw a great future for his beloved science of biology; no wonder that he gave up his intention of being a physician.

Sedgwick did not study bacteriology in Europe, but I remember hearing him tell how he received what was perhaps the first batch of Dr. Koch's sterilized nutrient gelatine sent to this country. Professor Nichols brought it over and probably had not realized its physical properties, for it had melted, had saturated the cotton plug of the flask, had oozed out, had become infected and nauseating and was about as far from having the required bacterial purity of a culture medium as one could imagine. It was an inauspicious beginning for bacteriology at the Institute. Professor Nichols must have chuckled over it, for at that time he did not share Sedgwick's optimism in regard to the future of bacteriology.

I remember those first lectures of Sedgwick's. He would hold up a glass of water and talk for an hour about what it contained. He would scare us to death by saying that it contained enough germs of typhoid fever to give the disease to a thousand people, and then go on to show how sanitary engineers could make the water safe to drink.

He started his students off on a hunt for bacteria. One of them studied the bacteria found in air—especially the air of hospitals—for he was hunting for big game. Together they devised a method for straining the bacteria from the air—an aerobioscope—a method still used. Another student helped him to study water—not only its bacteria, but its other microscopic organisms—those algæ which recently caused the bad taste in the water supply of Boston, when for a few weeks it was necessary to draw upon the old Lake Cochituate supply. Another new method of study

was devised—the Sedgwick Rafter method—still used to-day.

One of his students took up the study of milk; another that of food; and to-day the Institute has an important department of industrial biology. Several studied sewage and its methods of treatment, and for years this continued to be a fruitful field of research. Another studied the bacteriology of ice; another the bacteriology of soil. Then there were studies of particular species of bacteria—the longevity of the typhoid bacillus, and so on. The reason for mentioning these things is to illustrate the breadth of the investigations and the fact that Sedgwick always worked with and through his students. He did very little scientific work alone and he generally gave to his students more than a fair share of the credit for the work done.

We hear much said to-day about research, about the advantages of organized research. In my opinion there is danger that research may be organized to death. The compilation of facts by committees of learned societies is all very well, tests by competent scientists in government bureaus are desirable, and research conducted by the experts of great corporations are necessary in order that modern science may be applied in the most economical way to human needs—but the highest type of research is that which takes place in a university laboratory where an inspired teacher and his mature students sit down side by side and in quiet study endeavor to search out the secrets of nature and the chemical, biological, and physical laws of God. Let the scientists of America not follow too much the method of organized research—let them give even greater weight to the individual method of Huxley and Pasteur and Sedgwick.

When, after a long experience as a practising engineer, I came to Harvard to teach, I had many talks with Sedgwick about methods of teaching. He was no longer thirty-three years old, but fifty-five. He had been teaching for twenty-five years and he gave from his experience. He said, "I keep three things in mind—the past, the present, and the future. First, I teach by the historical method. That has two advantages: my students learn what has been done, and my lectures don't have to be written over every year. Second, I teach of what is going on now." His present-day students knew well his habit of rushing into the lecture-room with a clipping from the morning paper or a copy of the *Medical Journal* and talking about something which somebody had discovered in Chicago or the Fiji Islands, or about some new engineering project. All kinds of fish were caught in his net, and he believed that the students should study these fish while they were alive. Thirdly, he said, "I try to teach of what is likely to happen in the future. I try to make the students see the problems they will be up against." History, present problems, and research—these were his three principles.

His teaching was far from being exact. Sedgwick did not have a mathematical mind. His lectures were never formally prepared and as he grew older they became less methodical. He cared for general principles more than for details. The opening sentence of his first lecture to engineers, which I have already quoted, shows what he wanted most to impress upon his students. "The sanitarian needs a proper working theory." But it was chiefly his personal magnetism and his inspiration which told on his students, and this never failed him. His optimism was as strong at sixty-five as it was at thirty-five.

Sedgwick will be remembered first and foremost as a great teacher—yes, even as a teacher of teachers—because his enthusiasm was contagious and others followed in his steps. One has only to mention Dr. Calkins, of Columbia; Dr. Jordan, of Chicago; Dr. Winslow, of Yale; Professor Gunn, and other names, now well known, to realize the extent of Sedgwick's influence as a teacher upon teachers. But among his pupils are sanitary engineers, bacteriologists, health officers, laboratory workers in many fields, Red Cross officials, physicians, nurses, manufacturers, teachers of domestic science, housewives—men and women, a great company of enthusiastic followers who recognized him as "Chief."

Soon after Sedgwick came to Boston the

Massachusetts State Board of Health began to apply the new ideas in biology and chemistry to the purification of water and sewage under the leadership of Dr. Henry P. Walcott, who for a quarter of a century was chairman of the board, and Mr. Hiram F. Mills, a hydraulic engineer, who for an equally long time gave most valuable service to the commonwealth. A small station for making experiments with sewage and water was built at Lawrence, Mass. Professor Sedgwick was consulting biologist of the State Board of Health and Dr. Drown was consulting chemist. For many years, even up to this day, the Lawrence Experiment Station has been a center of scientific activity. Some of the leading sanitary engineers of the country began their work there.

While this scientific study of the chemistry and biology of water and sewage was in full blast (1890), a notable epidemic of typhoid fever swept down the Merrimac Valley. Professor Sedgwick made a thorough study of this catastrophe and developed methods of investigation which have been followed by American epidemiologists ever since. Although not a mathematician, he marshalled statistics and used them with telling force and drew from them logical conclusions which could not be upset. As a result of the epidemic and the research at the experiment station, the first scientifically designed municipal water filter in America was built at Lawrence. This filter, with additions and modifications, is still in use and although outgrown in size and ideas is to-day protecting the people of Lawrence against the recurrence of an epidemic like that of 1890. In this matter one can not give the credit to Sedgwick alone, for it was the entire group of scientists who deserve the credit—Mills, Stearns, Drown, Sedgwick, Hazen, Fuller, and others, most of all perhaps to Mr. Mills. Through them America gave to the world scientific ideas in regard to the disposal of sewage which revolutionized methods of treatment and stimulated the construction of disposal works in scores, perhaps hundreds of cities, in this country and abroad.

Sedgwick become a great interpreter of this scientific work. He joined the New England Water Works Association in 1890, but as early as 1888 he had contributed a paper on the Biological Examination of Water. He was chosen president of the association in 1906, having already (in 1904) been made an honorary member. His last address before the association was delivered on September 11, 1918, on a subject appropriate to the times, "From Peace to War, from War to Victory, from Victory to Just Judgment." Those who heard it will never forget the stirring words in which he called for stern justice for Germany and appealed to a higher ideal of God than that held by the Kaiser—the ideal of Christianity, the ideal of civilization. Sedgwick never separated his science from his patriotism or his religion. He could make science popular and he could take subjects of popular interest and clothe them in the language of science.

The American Public Health Association also claimed Sedgwick's attention. He became a member in 1902 and its president in 1915. He was a member of many committees, was a frequent speaker, most of his addresses having relation to the broader aspects of public-health work. It is hardly worth while at this time to recite the long list of scientific societies to which he belonged, but mention should be made of the Society of American Bacteriologists, which he helped to found and of which he was president in 1900, of the American Society of Naturalists, over which he presided in 1901, and the American Academy of Arts and Sciences, of which he was a Fellow and to which he gave much time and thought. Society memberships measure the breadth of a man's interest and give him opportunities for bringing his ideas before the scientific world. Some men are merely "belongers"—others, like Sedgwick, do their full part in promoting the objects of the societies which they join. As Professor Sedgwick advanced in life, his interest changed from one scientific society to another and his scientific papers shifted from the record of detailed studies to educational and philosoph-

ical problems. That change marked the normal development of an active, broadening mind. So we may add to Sedgwick's fame as a great teacher that of interpreter of science.

We must next look upon him as a councilor in public health. In 1914 when the State Board of Health was replaced by a health commissioner and public health council, Sedgwick was appointed as a member of the council and served in that capacity until his death. Together the commissioner and council constitute the State Department of Public Health. Its work is done partly through committees and Sedgwick served on the committee on sanitary engineering and was chairman of the committee on food and drugs. It is difficult to pick out from the many-sided activities of the State Department any particular work which was his, for in one way or another he has been in all of them. He was an ideal councilor. His scientific knowledge, his ripe experience, his grasp of fundamental principles made his advice respected by us all. His facility in writing clear and simple English was most useful to the council in the preparation of reports. I remember once that a certain sentence in a letter of advice to some city had been so phrased as to mean just exactly what it was not intended to mean. The commissioner and council had approved it. Sedgwick came in late, looked at the report, and immediately spotted the false phrase and thought it a great joke. He said, "Folks laugh at the sleepy old professors, but you see they have their uses." Sedgwick's graceful yet forceful manner of speaking caused him to be chosen on many occasions to represent the Department and whether he spoke before a legislative committee or a large public meeting he was always effective. Many a fight he has had at the State House with anti-vivisectionists, anti-vaccinationists, and various other kinds of antis—but Sedgwick's method of fighting was merely to state his side of the case, simply and forcefully, letting his opponent have a monopoly of the fireworks. It was perhaps one of his faults that he was not aggressive enough. But on occasion Sedgwick became eloquent. Last year at the Brussels conference of public health officers representatives of various nations, gorgeously arrayed in uniform and regalia, had been droning out weary speeches, the audience being visibly bored, when Sedgwick's turn came. He was there to represent the American Public Health Association, Harvard University, the Massachusetts Institute of Technology, and the U. S. Public Health Service. Simply dressed in his academic robes, he arose and spoke for ten minutes. He praised brave little Belgium and faithful France for saving the world, he gave to England the credit of being the father of public health administration, and then spoke for America. I do not know what he said—I was not there—but I have been told that the audience went wild in applause and that scores of people, including our own Ambassador, went forward after the meeting to shake his hand. It was the climax of the convention.

Professor Sedgwick of late had been keenly interested in the engineering study now being carried on jointly by the State Department of Public Health and the Metropolitan District Commission which looks forward to an extension of the water supply of the eastern part of the state, by the construction of a great reservoir in the Swift River Valley. Once in about twenty-five years every growing city or district has to enlarge its water supply, because it does not pay to construct works for a longer period ahead. It was in 1895 that the Wachusett Reservoir was recommended and a few years later put in use—and the time has now come when we of this generation must build a water supply for the next. It will be an expensive investment for the state, but not an unreasonable one, because it will be an income-producing investment. The project is one which appeals to the imagination. An abundant supply of pure water is one of the essentials of life. No community can prosper if it outgrows its water supply. Sedgwick, with his faith in Massachusetts, was therefore keenly alive to the importance of this new project, of which much will be heard during the coming year.

As early as 1882 Professor Sedgwick was elected a member of the Advisory Committee of the U. S. Public Health Service, and for nearly twenty years he maintained this connection with national public health affairs. When after the war a reserve organization was created in this service, Sedgwick was commissioned as assistant surgeon general. A few years ago he was made a member of the International Health Board, supported by the Rockefeller Foundation, and thus his interests became world-wide in their scope. Last year he went to England as exchange professor from the Massachusetts Institute of Technology to the Universities of Cambridge and Leeds—and on the eve of his departure a newspaper headline very fittingly characterized him as "Ambassador of Health."

During the past few days I have been reading over a list of the titles of the books and most important scientific papers which Sedgwick wrote between the years 1883 and 1921—about a hundred in number. If his minor writings had been included, the list would have been several times as long. Towards the end of his life he wrote less. Only a few weeks before his death he said to me, "I sometimes get sick of talking about health; every Tom, Dick and Harry is now talking about it, and most of what they say is so exaggerated that it casts discredit on all of us who are trying to speak within the bounds of sanitary science."

And I wish to take this occasion to express my own views that just as there is danger that scientific research may be organized to death, so there is danger that public health may be organized and legislated, propagandized and commercialized to the point of nullification. There is danger that over striving for the welfare of particular classes of people may result in misfortune to the people as a whole. Sensible education in the principles of healthy living should be universal, but neither the state nor the nation should embark upon programs of socialization of medicine, socialization of nursing or the paternalistic or maternalistic care of the health of individuals without first looking ahead to see where such policies lead, socially, financially and politically. The police power of the state should be used severely to prevent crimes against the public health; the advisory powers of health departments should be freely used, but the treasury of the state should not be drawn upon to pay for personal benefits or class benefits even in the name of health. Public health and private health are not the same, and governments may do for the one what they ought not to do for the other.

We Americans can not boast of the success of our governments, especially the governments of our cities. We can not boast of our governmental methods of public health administration—and unfortunately our local governments are not becoming more efficient as they become larger. Let us not therefore make the mistake of turning too many of our health activities over to the governments. In one thing, however, America has excelled and that is its voluntary cooperative undertakings. Let these continue to use their influence for improving personal health, leaving to the governments only those matters which legitimately belong to the health of the people as a whole. The time is rapidly approaching when the financial problems of our cities and states will overtop all others—sanitary and public health problems included—when appropriations of all kinds will be cut to the bone to ward off insolvency or repudiation of debts. Let us not make our people too dependent on their governments for health protection, but let us by education seek to make them protect their own health, for what they pay for they will value most.

There is one other aspect of health activities which I can not refrain from mentioning in this connection. Too much thinking about one's health makes a person morbid. It is possible for communities to get into the same condition. After all, there is more health in the world than there is sickness. I tell my students that while as professional health officials they must study death-rates, as individuals they must look well to the life rates, for except in old age the chance of living is far greater than the chance of dying

and we can sepnd our time best by living and not trying to stay alive. Fortunately, health is a positive quality which can be cultivated in ways that are pleasant, and with reasonable understanding and moderate care we can protect ourselves against those diseases which are preventable.

I am personally out of sympathy with injecting the propaganda and the slogans of public health into the services of the churches, although I am most heartily in favor of church people doing all that they can to mitigate human suffering by methods of prevention as well as those of relief. This concerted movement of the women of Boston to improve the health of our children strikes a responsive chord in all of us. We know that Professor Sedgwick's voice would have been lifted up in favor of this weeks' crusade. His very heart went out to the refugee children of France, and one of the most beautiful episodes of his life was associated with Château Lafayette, which he and Mrs. Sedgwick visited last summer and to which they hoped to return.

We come finally to Sedgwick's last great work in connection with the School of Public Health of Harvard University and the Massachusetts Institute of Technology. This school he helped to establish in 1913 and served as chairman of the administrative board until his death. He delighted to see it grow, he delighted to see students coming to it from foreign countries—from Italy, from China, from South America, from India and Siam, from Czecho-Slovakia, and from Mexico. Few people of Boston realize how solidly this little school has taken its place as a center of public-health education, or how its example has been followed by other universities in America.

Nearly twenty years ago when Sedgwick joined the American Public Health Association, he was made a member of a committee on the Teaching of Hygiene and the Granting of the Degree of Doctor of Public Health. He always held the view that the public health service was different from the medical service, that a man could be an efficient health executive without being a doctor. His last important address, given at the 100th anniversary of the medical school of the University of Cincinnati, was devoted to the subject of the education of health executives. He advocated what he called the Y plan, by which medical schools should have two programs, alike during the first two years, but afterwards diverging, one towards the degree of doctor of medicine and one towards the degree of doctor of public health.

His last act as a member of the administrative board of the School of Public Health, held December 19, 1920, was to assist in preparing a statement relative to the future of the school, planning for a reorganization of its government and doing so at the sacrifice of his own position as chairman and having in mind only the future good of the cause of public health education. In time to come Sedgwick's part in the organization of this school, which seems destined to take its place side by side with the Harvard Medical School, will stand forth as one of his most constructive works. May it not be possible that in the near future some friend or group of friends will contribute a fund big enough to endow a William Thompson Sedgwick professorship in this School of Public Health of Harvard University and the Massachusetts Institute of Technology which he loved so well. What finer memorial could be given than one which would tend to make his name and teaching known to the students of the coming years!

And so we may sum up Professor Sedgwick's life as that of a great teacher, an interpreter of science, a wise councilor, an ambassador of public health. Friend of young men, loyal supporter of the institute, patriotic citizen, a Christian gentleman, he will be greatly missed by all who were fortunate enough to know him.

On Sunday mornings I like to hear the Harvard student choir sing in Appleton Chapel. Sometimes the music rises and falls in varying melody until at the end it fades away as in a distance. At other times it pursues a simple motif, which grows in volume until it culminates in a burst of song and, on a sudden, ceases. For an instant the air tingles

and is still. But the memory of the glorious chord goes with us through the day "to charm, to strengthen, and to teach." Thus it was that Professor Sedgwick lived and died and stays forever in our hearts

George C. Whipple

OUR DISAPPEARING WILD PLANTS[1]

The destruction of the vast herds of bison on our western plains, the total extinction of the formerly abundant wild pigeon, the extermination of many of the most beautiful of our wild birds, all this is a matter of common knowledge. How many of us, however, realize that the same rapacious spirit of destruction has seriously endangered our wild plant life, until many of our most desirable plants have actually disappeared from wide areas of our country?

The earliest Europeans in America found in the New World a flora marvelously rich in its abundance of species and indescribably beautiful in its display of attractive plants. Since the time of the earliest settlers this wonderful flora has suffered a gradual depletion until at present the flora in many regions is a mere relic of the past with hardly a suggestion of its pristine loveliness. The appreciation of mankind was expressed in an odd manner indeed when he removed the handsomest of the plants, allowing the dull and less attractive species to take their place. This painful tragedy has been enacted right here in the vicinity of Washington, where the formerly luxuriant display of laurel, rhododendron, holly, ground pines, and arbutus has in many places been supplanted by weedy and generally unattractive species. All the plants named are almost extinct within a wide radius of the city and the wild orchids, spring beauties, bluebells, and many other species of rare grace and beauty are vanishing rapidly, and will soon live in memory only unless active steps are taken to save them.

The causes leading to their disappearance are complex, but by far the greatest contributing factor is the unrestricted, indiscriminate, thoughtless picking to which these beauteous plants are subjected. Each spring witnesses the descent of legions of thoughtless flower-gatherers who ravish the flora with hardly a thought that the tearing away of the flowers robs most plants of their only methods of reproduction. These misguided hordes gather huge armfuls and basketfuls of hepatica, anemone, bloodroot and dozens of other rapidly-wilting plants, which are enjoyed for the moment but are soon strewn along the highways and byways in withered, unsightly masses, mute evidence of wanton destruction of nature's most perfect gifts. The process of extermination has of late been largely aided and widely extended by that new enemy of our flora, the automobile, penetrating into regions formerly remote or inaccessible and returning loaded with huge piles of drooping, withered branches of flowering dogwood, redbud, and service berry, torn out by trespassers who had neither moral nor legal justication for such disfiguration. Who has not seen great branches of dogwood and bunches of other wild flowers offered for sale by irresponsible street-merchants? Within a half-hour during an automobile drive while the redbud and flowering dogwood were in bloom, the speaker was accosted twelve times along Conduit Road near Washington, D. C., by boyish flower venders offering their ill-gotten wares. The accumulated destruction of years will be great until it is inevitable that the handsomest of our species will disappear.

Must these wondrous gifts of nature live only in song and story for the countless oncoming generations? Is it fair that we dissipate this great natural heritage, robbing posterity of the pleasures derived from our flowers which we now so fully enjoy? It would seem that the doctrine of the greatest good for the greatest number demands that we accept this rich birthright in guardian spirit, to be safeguarded and preserved for the enjoyment of those who come after us; that each generation act as trustees of the surrounding

[1] An address delivered with illustrations before the Botanical Society of Washington, D. C., October 5, 1920.

flora, executing its trust in such a manner that the beauty of our native wild plants may continue in perpetuity.

The danger to our wild flora is so great as to have already been recognized by legislators. A recent Maryland law forbids the removal of plants unless either the written consent of the owner of the premises has been obtained or else under the owner's personal supervision. If such consent is not obtained, the picking of wild flowers is a misdemeanor, punishable by a fine of from five to twenty-five dollars, by imprisonment from thirty to ninety days or by the infliction of both of these punishments. Of far greater importance than the fear of punishment, however, is the creation of an appreciative sentiment in favor of the plants, because, after all, the ruthless destroyers are really the friends of the flowers, considerate and kindly disposed, but thoughtless in their acts. Usually a mere suggestion is thrice more powerful than a threat. The speaker is reminded of an experience with a college class in botany to whom he had talked on this subject. Some time later while on an excursion into the mountains, a single lady's slipper was encountered as a relic of a formerly abundant flora of this gorgeous wild orchid. Instead of the usual desire to pick and wear, the flower was allowed to remain on the stalk, perhaps to set seed and repopulate the vicinity with this splendid plant. No amount of legislation would have saved it; the appreciation of the class was shown by allowing the flower to remain for others to enjoy. A thousand people can enjoy what a single hand could destroy forever.

The remedy for the situation is to substitute the present wanton, promiscuous, unguided methods of gathering plants with regulated, sane and rational means. It is not at all necessary to forbid the picking of flowers, but sufficient should always be allowed to remain, particularly in the case of annuals, to produce seed and so perpetuate the species. Plants should never be gathered by the roots, as is so frequently the case with hepatica, anemone and bird-foot violet. Plants growing from long, creeping stems, as arbutus and ground pine (lycopodium) should never be torn out. It is best to cut the flowering stems of arbutus either with a sharp knife or a pair of scissors, allowing the long, leafy stem to continue its work of flower-production. The beauty of shrubs should never be violated by tearing the branches and in so doing peeling the bark to the base, thereby not only disfiguring the plant but also creating ready access for the entrance of fungi and other enemies which cause death. In case it is felt necessary to remove some of the branches of flowering shrubs, it is best to select such members as will mar the beauty least and cut them close to the base with a sharp knife in such a manner that the bark will eventually callous over the wound. Phlox, wintergreen and other scarce wild plants should never be purchased either from florists or street vendors. because by so doing one merely encourages the commercial exploitation of the wild flora. Recently the speaker witnessed an exhibition of goods placed upon a background of many square yards of moss torn from neighboring woods. Such a carpet of moss took nature scores of years to build up and it should not be destroyed in a moment, to be replaced by a huge bare spot where formerly all was green. The appreciation of the beauties of nature should be taught in our schools and churches where a mere hint of the situation is all that is necessary to insure hearty cooperation. Much can also be done by the establishment of private preserves for wild life, where the flora and fauna may exist undisturbed in primeval splendor.

It is especially desirable that plants such as the wintergreen be allowed to mature fruit as food for birds during the harsh winter months. Without this source of food, many birds die of winter starvation. It is desirable that the picking of such weedy but attractive plants as daisies, buttercups, golden rod and asters be encouraged, since by so doing no harm results and the farmer is assisted with his weed problem. In addition, the cultivation of wild plants in our gardens may save many species for the enjoyment of future generations.

We have sufficient precedence from other regions to guide us, as the total extinction of the yellow moccasin flower in Center county, Pennsylvania, and the extirpation of the pitcher plant, fringed gentian, azalea and wild lilies from many localities. We should profit from the experience of others and treat our wild flora as a natural resource which should be neither squandered nor destroyed, but should rather be treated in a sane and thoughtful manner, so that it may be appreciated and enjoyed by those who follow us.

Albert A. Hansen

A SUGGESTION FOR MAKING OUR SCIENTIFIC PUBLICATIONS MORE USEFUL AND OUR POST-OFFICES A CENTER OF INFORMATION

It is evident to all persons who have thought about the matter that our federal and state scientific publications are not as widely used or as well known as their great value to the public warrants. There are two principal reasons for this: first, because it is difficult to promptly obtain them and, second, because comparatively few people know of their existence as the government has found no effective way of advertising them.

Sportsmen and scientists, for example, frequently find that the guides of a region of which an excellent topographic map has been made by the government are not aware of the existence of the map although it would be of great value to them in their work. It is perhaps conservative to say that most automobilists do not even know what topographic maps are, and that, when they do know, they can not obtain them unless their tour is planned long in advance. The writer has never but once seen a topographic map in the home of a farmer, notwithstanding the fact that it would be a source of great pleasure and profit to him. If a publishing house had issued maps of such excellence it would have expended thousands of dollars in advertising them so that, if possible, every home might have a map of its own neighborhood. As a matter of fact the expense of publishing these maps is so great that no private concern could make them for sale at a profit. Nevertheless, after they have been published, no effort is made to let the people whose taxes paid for them learn of them and of their value.

A few examples from the writer's experience—which can be duplicated by many persons—will illustrate the characteristic inaccessibility of our federal and state publications. Many times he has wanted the topographic maps of a region but was unable to obtain them because he could not wait until he received them from Washington. At Zion National Park, Utah, this past summer not only were no topographic maps for sale but none could be consulted. At Uvalde, Texas, there are some interesting volcanic necks which are mapped and described in a United States Geological Survey Folio but when the writer stopped off to study them he found that no folio was available and, as far as he could learn, no one in the region owned a copy. At Ardmore, Okla., he wished to consult the geological literature of the region and found that the Carnegie Library has neither the publications of its own state nor the excellent United States Geological Survey Professional paper of the region. Many similar instances could be cited.

The biological and botanical publications are equally inaccessible. The archeological publications dealing with the Cliff Dwellings, the prehistoric ruins of New Mexico and Arizona, the Mound Builders of Ohio, and elsewhere, might almost as well never have been published as far as their usefulness to the visitor who has not had time to secure them from Washington is concerned.

The only justification for this state of affairs is that one can obtain the government publications in Washington and the state publications at the state capitols by writing for them; but it should always be added "if one has the time to wait for them."

The writer proposes two remedies:

1. That every first, second, and third class post-office shall be provided with a framed, printed list of the federal and state publica-

tions which deal with the region in which it is situated as well as of historical and other publications of local interest. It is, perhaps, evident that if it became generally known that every first, second, and third class post-office contained such a list of publications the traveler and resident in search of information would immediately go to the post-office to consult the list.

2. The second suggestion is that every postmaster shall have on sale all of the federal and state publications on the exhibited list.

In order to put this suggestion in practical form the writer prepared the following list for his home town:

PUBLICATIONS ON WILLIAMSTOWN AND VICINITY

Maps

The Greylock, Bennington, Berlin, and Wilmington topographic maps published by the United States Geological Survey. Show the location of roads, streams, houses, and elevations. On exhibition and for sale here.

Local History

"Origins in Williamstown," by Professor A. L. Perry. An account of the early history of the Northern Berkshires. Can be consulted in the Village and College Libraries.

"A History of Williams College," by Professor L. W. Spring. A history of the local college from its foundation to 1916. Can be consulted in the Village and College Libraries.

"Boyhood Reminiscences," by Keyes Danforth. Published in 1895. An interesting account of the houses, people, and customs of the time. Can be consulted in the Village and College Libraries.

Geology

"Taconic Physiography," by T. Nelson Dale, U. S. Geological Survey Bulletin 272. Contains excellent descriptions and explanations of the scenery of the Berkshires. Can be consulted in the Village and College Libraries.

"Geology of the Green Mountains," by Pumpelly, Wolfe, and Dale. United States Geological Survey Monograph XXIII. Contains a technical discussion of the geology of the region. Can be consulted in the Village and College Libraries.

"Final Report of the Geology of Massachusetts, 1841," by Edward Hitchcock. Interesting chiefly from a historical point of view. Can be consulted in the College Library.

Zoology

"Birds of New York," by E. H. Eaton. New York State Museum Memoir 12. Illustrates, with 106 colored plates, the birds of New York and New England. Can be consulted in the College Library.

"Useful Birds and their Protection," Edward H. Forbush. Massachusetts Bureau of Agriculture. An illustrated and interesting book on the birds of the state. Contains brief descriptions of the more common birds and accounts of their food and habits. Can be consulted in the Village and College Libraries.

Botany

"Wild Flowers of New York," by H. D. House. New York State Museum Memoir 15. Illustrated with many admirable colored plates. As the New York and New England species are for the most part identical this volume is as valuable for Williamstown as for New York. Can be consulted in the College Library.

"Bog Trotting for Orchids," Grace Greylock Niles. A popular description of the kinds and habits of orchids in this region. Can be consulted in the Village and College Libraries.

Agriculture

Lists of publications of great practical use to the farmer, stockman, and poultryman are on an adjoining bulletin board. The bulletins on these lists are published by the United States Department of Agriculture, the Massachusetts Agricultural Experiment Station at Amherst; the New York State Agricultural Experiment Station at Ithaca, and the Connecticut Agricultural Experiment Station at Storrs.

Collections and Objects of Local Interest

The sword and other personal property of Ephraim Williams, the founder of Williams College. In the College Library.

Collections of local rocks and other exhibits. In the Geological Museum, Clark Hall.

Mission Monument, Mission Park.

Block House Marker, West Main Street, on the property of the Kappa Alpha House.

The desirability of such a list in every post-office in the land becomes greater as automobile travel becomes more general. (In one

state there is, on an average, one automobile for every six persons.) Farmers, who, a few years ago, seldom went further than their nearest town now go many miles in their automobiles. When they reach a town new to them they want to see whatever is of interest. If all automobilists and other travelers knew a list such as the above could be found in the post-office they would first go there for information.

There is another important reason why such lists should be on exhibition in post-offices. It is very desirable that some person or persons in every community should know what has been written about their region. If those government and state publications pertaining to a region were listed and on sale at the post-offices, the postmasters and their assistants would know about them and through them this knowledge, which at present is confined to comparatively few, would be disseminated.

All this could be accomplished if congress should pass the following laws:

1. A law ordering the exhibition of a list of the publications pertaining to the region in which the post-office is situated, of somewhat the same character as that for Williamstown, Massachusetts.

2. A law ordering the scientific bureaus to send to each first, second, and third class post-office all of the government publications of local interest, and directing the postmasters to offer them for sale.

3. A law ordering that state publications be offered for sale by the postmasters if the state legislatures so direct.

It is hoped that all scientists and others interested will write to their congressmen urging the enactment of such a law as that outlined above so that our excellent government and state publications may become better known and so that our post-offices may become centers of greater usefulness.

Herdman F. Cleland

SCIENTIFIC EVENTS

THE INSTITUTE OF HUMAN PALEONTOLOGY

On December 23, 1920, the Institute of Human Paleontology in Paris was formally declared open by Prince Albert of Monaco, its founder. The account in *Nature* states that the institute is situated in the Boulevard Saint Marcel. The building, which was nearing completion when war broke out, contains a large amphitheater for lectures and meetings, a spacious library, and a number of rooms fitted up as laboratories, for examining and photographing the material furnished by excavation. Collections of specimens from the sites which have already been explored, as well as reproductions of the paintings and drawings found on the walls of the French and Spanish paleolithic caves, are exhibited in the building. An endowment of two million francs is attached to the Prince of Monaco's foundation, and an additional sum has been promised should it be rendered necessary by any further increase in the cost of living. The institute is under the direction of M. Marcelin Boule, assisted by a council consisting of MM. Salomon Reinach, Dislère, Verneau and Louis Mayer.

Among those who were present at the opening ceremony were the President of the French Republic, M. Millerand, H.I.H. Prince Roland Bonaparte, M. Honnorat, then Minister of Public Instruction, the Belgian and Italian Ambassadors, the Argentine and Persian Ministers, M. Lacroix, secretary of the Academy of Sciences, the president of the Academy of Medicine, and representatives of the College of Medicine, the Collège de France, the Pasteur Institute, and the various scientific societies. An inaugural address was delivered by the Prince of Monaco, who defined the broad aims of human paleontology. At the conclusion of the prince's address brief speeches were made by M. Honnorat, minister of public instruction, M. Perrier, and M. Le Corbeiller, president of the Municipal Council, the last named speaking on behalf of the city of Paris. Lastly, M. E. Cartailhac, the veteran archeologist, expressed his joy at the creation of the institute, which, he said, had been his dearest wish throughout his career as an archeologist.

A NEW CANADIAN AGRICULTURAL JOURNAL

The problems of technical agriculture in the adjoining provinces of Canada are essen-

tially the same as those of the northern states of this country. Anyone who has taken the trouble to familiarize himself with the situation can not fail to be impressed with the similarity of aims and ideals in agricultural investigation and education in Canada and the United States. The workers in technical agriculture are responsible for much of the recent progress and prosperity of Canada. This is perhaps most appreciated in this country by those of us who are engaged in similar lines of work in the northern states and who, through correspondence and frequent conferences upon mutual problems with our colleagues in adjacent provinces, are best informed as to the results they have accomplished and the progress that they are making. Therefore the writer feels that a new agricultural journal, the official organ of the Canadian Society of Technical Agriculturists, will be welcomed and will find many readers on this side of the international boundary.

The first issue of *Scientific Agriculture and La Revue Agronomique Canadienne* bears the date of January 1, 1921. It is published monthly by the Industrial and Educational Publishing Company, Ltd., Gardenvale, P. Q. The title page states that it is: "A magazine devoted to the general advancement of agriculture in Canada. Published in the interests of agricultural science and research." The aims of the journal are set forth in more detail in the following quotation from the inital editorial.

As the official organ of the Canadian Society of Technical Agriculturists, our columns will naturally give publicity to the work which that organization is doing. The articles published will, as far as possible, treat with the educational, scientific and more progressive phases of agricultural effort. Certain pages will perhaps appear to be of primary interest to members of the C. S. T. A., but the general reader will find much information in those pages that is of equal interest to him.

We particularly desire to cooperate with the present existing agricultural press, and to assist them in any way possible. We do not intend to be competitive, nor to trespass severely upon the ground which they are already covering. We feel, however, that there is a place for a magazine which can represent technical agriculture in this country and we feel certain that no existing publication will dispute that claim, or hesitate to welcome this venture.

As the name of the publication suggests, articles will be printed both in English and French.

WARNER J. MORSE
MAINE AGRICULTURAL EXPERIMENT STATION,
ORONO, MAINE

SCIENTIFIC LECTURES AT THE UNIVERSITY OF MINNESOTA

THE following program of Sunday lectures is being given at the Zoological Museum of the University of Minnesota:

January 2. "The winter bird-life of Minnesota." By D. Lange, principal of the St. Paul Mechanic Arts High School.

January 9. "The geology of the Minnesota iron ores." By W. H. Emmons, professor of geology, University of Minnesota.

January 16. "The work of the state game and fish commissioner." By Carlos Avery, game and fish commissioner of Minnesota.

January 23. "The story of the wheat rust." By E. C. Stakman, professor of plant pathology, University of Minnesota.

January 30. "Animal pets and their relation to health." By W. A. Riley, professor of entomology, University of Minnesota.

February 6. "Some Minnesota butterflies and moths and the mystery of their double lives." By Royal N. Chapman, assistant professor of animal biology, University of Minnesota.

February 13. "The work of the chief state forester." By Wm. T. Cox, chief forester of Minnesota.

February 20. "The mysteries of pond life." By C. P. Sigerfoos, professor of zoology, University of Minnesota.

February 27. "The Indians of Minnesota: past and present." By A. E. Jenks, professor of anthropology, University of Minnesota.

March 6. "Itasca state park and its wild life." By Thos. S. Roberts, director of the zoological museum, University of Minnesota.

March 13. "Living lanterns of fireflies and other animals." By E. J. Lund, associate professor of animal biology, University of Minnesota.

March 20. "Our spring flowers." By N. L. Huff, assistant professor of botany, University of Minnesota.

March 27. "The home-coming of our birds." By Thos. S. Roberts, director of the zoological museum, University of Minnesota.

THE MARSH FUND OF THE NATIONAL ACADEMY OF SCIENCES

At his death in 1899 Professor O. C. Marsh left to the National Academy of Sciences a sum slightly in excess of $7,000, the income from which was to be used for support of researches in natural history. By reason of judicious handling, the principal and interest now amount to more than $20,000, and the income is made available to the Committee on the Marsh Fund for grants in accordance with the original purpose of the bequest. At its last annual meeting the National Academy approved the following recommendations of the Committee on the Marsh Fund, namely:

> That in general the income be used for important pieces of constructive, scholarly work within the field of science to which Professor O. C. Marsh gave his principal effort. It seems appropriate that grants in the first instance should be used for the support of paleontological and geological research, and that beyond this field the committee should next consider research in aspects of biology related especially to paleontology.

The interest on the Marsh Fund available for the coming year will make possible grants totaling approximately $1,500. The committee deesires to make the allotments in such a manner as to contribute most definitely to the advance of constructive work in the subject to which Professor Marsh dedicated this gift.

Suggestions as to the best utilization of funds will be appreciated. Proposals made may take the form of recommendations regarding problems to be solved, or may concern individuals or organizations guaranteeing through their work the type of constructive effort to which the support of this fund might well be given.

Applications or recommendations should be forwarded to the secretary of the National Academy of Sciences, Smithsonian Institution, Washington, D. C., on or before April 5, 1921.

John C. Merriam, *Chairman,*
Marsh Fund Committee

THE ELECTION OF DR. ANGELL AS PRESIDENT OF YALE UNIVERSITY

The Yale Corporation at its adjourned meeting on February 20 by unanimous vote elected James Rowland Angell as president of the university to succeed Arthur Twining Hadley at the close of the present university year. While the decision was reached last week, no formal action was taken until it was ascertained that Dr. Angell could accept. The Corporation has endeavored to choose for its head the ablest educational administrator available in the United States, irrespective of the college of his graduation or the place of his residence.

Dr. Angell is a son of the late President Angell of the University of Michigan, a graduate of that university of the class of 1890, and as professor at the University of Minnesota, professor, dean and acting president of the University of Chicago, chairman of the National Research Council, and president of the Carnegie Corporation, he has shown ability as an administrator and as an educational leader. Dr. Angell is a distinguished psychologist, having been president of the American Psychological Association and being a member of the National Academy of Sciences. Dr. Angell gave the Thomas Lecture to freshmen at Yale this year and was sought for by Yale several years ago for a chair in the Department of Philosophy and Psychology.

The election of Dr. Angell to the Presidency of Yale comes as a result of ten months of study on the part of the Corporation to decide on the strongest man in America for the position. President Hadley submitted his resignation April 10, 1920, and a committee was appointed to receive names of possible candidates for the office of president and to transmit them to the Corporation. In this way some eighty names have been under careful consideration. The Corporation believes "that no one in America combines the breadth of educational experience, and businss ability, high public service and spiritual ideals more completely than Dr. Angell. He has also shown during his many years of

service at the Universities of Minnesota and Chicago a rare capacity for sympathetic understanding of undergraduate life."

President-elect Angell is now in the south. It is expected that he will later make regular visits to confer with members of the faculty and familiarize himself with the Yale situation.

SCIENTIFIC NOTES AND NEWS

AT the annual meeting of the trustees of the American Museum of Natural History changes in the scientific staff were announced as follows: Dr. J. A. Allen, former curator of mammals, was made honorary curator of mammals; Dr. Henry E. Crampton, former curator of invertebrate zoology, was made honorary curator, and Dr. Willard G. Van Name was made assistant curator of lower invertebrates; Dr. F. E. Lutz, former associate curator of invertebrates, was made curator of entomology; Dr. Robert Cushman Murphy, former curator of the department of natural science at the Brooklyn Museum, was made associate curator of marine birds; Mr. Carl E. Akeley was made associate in mammalogy; Dr. J. Howard McGregor, of Columbia University, was made research associate in human anatomy; Mr. E. W. Gudger was made an associate in ichthyology. A new department was formed, to be known as the department of comparative anatomy, of which Dr. William E. Gregory and Mr. S. H. Chubb, both previously of the museum's staff, were made curator and assistant in osteology, respectively.

AT the Charter Day Exercises of the University of Pittsburgh on February 18, the honorary degree of doctor of laws was conferred upon Mr. William Boyce Thompson, the copper industrialist of New York, N. Y. On the same occasion the honorary degree of doctor of science was conferred upon Mr. C. H. MacDowell, president of the Armour Fertilizer Company and director of the chemicals division of the War Industries Board during 1918. These honors were given upon the recommendation of the Mellon Institute of Industrial Research.

DR. A. F. BLAKESLEE, of the department of genetics of the Carnegie Institution of Washington, has been elected an associate member of the Royal Botanical Society of Belgium.

THE American Genetic Association has awarded the Frank N. Meyer medal on Dr. Trabut, a botanist who is a member of the faculty of the University of Algiers.

MR. LLEWELLYN TREACHER has been selected for the Foulerton award of the Geologists' Association.

AT the annual general meeting of the Faraday Society, London, the following officers were elected to serve for the coming year: President, Professor A. W. Porter; Vice-presidents, W. R. Cooper, Professor C. H. Desch, Dr. J. A. Harker, Emil Hatschek, Professor T. M. Lowry, Dr. E. H. Rayner and Dr. G. Senter.

LAWRENCE WILKERSON WALLACE was elected secretary of American Engineering Council at the meeting of the executive board in Syracuse, N. Y., on February 14, succeeding L. P. Alford, of New York, who has been acting secretary since the formation of the council on November 19, 1920.

AT the meeting of the board of trustees of the American Medical Association held on February 5, the following fellows were re-elected for terms of six years to positions on the editorial boards of the special journals published by the association as indicated: Richard C. Cabot, Boston, *Archives of Internal Medicine;* John Howland, Baltimore, *American Journal of Diseases of Children;* Samuel T. Orton, Iowa City, Iowa, *Archives of Neurology and Psychiatry;* Martin E. Engman, St. Louis, *Archives of Dermatology and Syphilology.* E. S. Judd, Rochester Minn., was elected to the editorial board of the *Archives of Surgery,* succeeding Dr. William Mayo, who had resigned.

AT the "Utility Corn Show" held at Galesburg, Ill., January 5 and 6, Mr. J. R. Holbert, agronomist, Office of Cereal Investigations, U. S. Department of Agriculture, was presented with a silver loving cup inscribed:

"Awarded to J. R. Holbert in recognition of unselfish devotion to study of corn diseases."

Dr. J. D. Morgan, Ph.D. (Columbia '16) has been appointed clinical psychologist in charge of the psychology clinic in the department of philosophy and psychology, and psychologist at the psychopathic hospital of the University of Iowa. Dr. Morgan is at present stationed in the Hawaiian Islands engaged in army hospital reconstruction work.

Charles F. Farmer, assistant professor in the school of forestry at the Montana State University at Missoula, has resigned to take a position with a Tacoma wood pipe company.

Dr. Margaret C. Ferguson, professor of botany at Wellesley College, and chairman of the department, has leave of absence during the present year and sailed for Australia and New Zealand on January 25 after spending the last six months in California, devoting most of her time to research work.

Dr. Wilder G. Penfield, of Princeton, has received a Beit fellowship. He will make researches in the pathological development of medical science in England during the coming year.

Dr. Raymond F. Bacon, director of the Mellon Institute of Industrial Research of the University of Pittsburgh, has returned from Europe where he spent the holidays in France and Italy in the investigation of nitrogen-fixation processes.

Sir Francis Younghusband, president of the Royal Geographical Society, announced at the meeting of the society on January 24 that the chief of this year's expedition to Mount Everest will be Colonel Howard Bury, while the actual reconnaissance of the mountain will be in the charge of Mr. Harold Raeburn, who will leave England for India in March.

We learn from *Nature* that in cooperation with the Anglo-Batavian Society, the University of London has made arrangements for an interchange of lectures on medical subjects between London and the Netherlands. The first lecture of the series to be given by Dutch professors was delivered by Professor Wertheim-Salamonson, of Amsterdam, on January 17 at the Royal Society of Medicine, on "Tonus and reflexes." The second lecture was given by Professor Boeke, of Leyden, on February 16.

At the meeting of the Royal Society on March 3 a discussion on isotopes will be opened by Sir J. J. Thomson.

Professor W. F. G. Swann, of the University of Minnesota, gave to the undergraduate students of Northwestern University on February 16, "A popular account of Einstein's theory of relativity." In the evening of the same day he lectured before the Graduate Club of Northwestern University upon "Some unsolved problems in cosmical physics."

The Galton anniversary meeting was held in London on February 16. The Galton lecture, preceded by a dinner, was given by Dr. W. Bateson, on "Common sense in racial problems."

Mrs. Fredonia Johnston Pratt, of St. Louis, Mo., widow of the late Dr. David S. Pratt, assistant director of the Mellon Institute of Industrial Research of the University of Pittsburgh, has established in that institution an industrial fellowship as a memorial to Dr. Pratt. The incumbent of this industrial fellowship will conduct research in that field of organic chemistry in which Dr. Pratt was especially interested.

Professor Irving Angell Field, head of the department of biology at Clark University since 1918, died on February 14 at his home in Worcester.

We learn from *Nature* that Dr. John Beattie Crozier, author of works on intellectual and social development, died in London on January 8. He was born in Canada in 1849.

Frédéric Houssay, professor of zoology at the Sorbonne and dean of the faculty of science, has died at the age of about sixty years.

Carl Toldt, professor of anatomy at Vienna, has died at the age of eighty years.

We learn from the *Journal* of the American Association that as a memorial to the late

General W. C. Gorgas and in recognition of his achievements in preventive medicine, Dr. Belisario Porras, president of the Republic of Panama, has proposed the foundation of an institute of tropical and preventive medicine in connection with the Santo Tomás Hospital at Panama. Pending the erection of a permanent building it is planned that the institute shall comprise a well-organized laboratory for research in tropical diseases in the Santo Tomás Hospital. After the laboratory has been established it is contemplated to organize a school of tropical medicine. As it is the wish of President Porras that the institute be a contribution of the Republic of Panama to the memory of General Gorgas, the project will be financed by the Panamanian government. Although the work of the institute will be largely in the interests of the countries of Central and South America, it is hoped that its activities will give it an international scope and that it will have the active cooperation of leaders in tropical and preventive medicine. At a meeting held in Washington, January 31, a provisional board of directors for the United States was appointed, including Admiral William C. Braisted, M. C., U. S. Navy, chairman; Dr. Leo S. Rowe, director of the Pan-American Union; Surgeon-Generals Ireland, Stitt, and Cumming of the Army, Navy and Public Health Service, respectively; Hon. J. E. Lefevre, chargé d'affaires of the Republic of Panama, in Washington, and Hon. John Bassett Moore, legal representative. A similar board will be named to represent the countries of Central and South America.

UNIVERSITY AND EDUCATIONAL NEWS

THE Smith-Towner bill, creating a Department of Education and providing federal aid to the states for the promotion of education, has been favorably reported by the House Committee on Education.

THE first Congress of the Universities of the British Empire was held in London in 1912 when all, to the number of fifty-three, were represented. It was decided to hold the congresses every five years, but the war made it impossible to do so in 1917. The second congress will accordingly be held in the summer of 1921. The number of British universities has in the meantime increased to fifty-eight. From July 5 to 8, the representatives will be entertained by Oxford University.

PROFESSOR C. E. HORNE, of the University of Porto Rico, has been appointed dean of the college of agriculture and mechanical arts at the University of Mayagüez, P. R.

RICHARD HAMER, M.A. (Toronto), formerly assistant professor of physics at the Carnegie Institute of Technology, Pittsburgh, has accepted a Whiting fellowship at the University of California where he is now engaged in research on the "Photo-electric effect."

PROFESSOR FRANK LINCOLN STEVENS, of the University of Illinois, has been appointed Bishop Museum fellow at Yale University for the next university year. Dr. Oskar Baudisch, formerly of the University of Zurich, has been appointed research associate in the university for next year on the recommendation of the department of chemistry, approved by the board of permanent officers of the graduate school. Dr. Baudisch's publications include "The assimilation of inorganic nitrogenous compounds by plants," "The theory of color lakes" and "Complex iron salts."

DISCUSSION AND CORRESPONDENCE

ON A BOTTLE WHICH DRIFTED FROM THE GULF OF MAINE TO THE AZORES

IN a previous note[1] the writer has referred to certain drift-bottles set out in the Bay of Fundy for the purpose of investigating the movements of the water there. Some of these bottles were found on the shores of the Gulf of Maine and indicated by their drift a superficial circulation of the water in the Gulf. Since writing the note one of the bottles set out last year off the coast of New-Brunswick has been returned from the Azores. The bottle was set out on August 29, 1919, one mile southeast of Point Lepreaux on the New

[1] SCIENCE, N. S., Vol. LII., No. 1349, November 5, 1920, page 442.

Brunswick coast (Lat. 45° 3′ N., Long. 66° 28′ W.) and was found on August 8, 1920, on the shore at "Ponta Delgada, Flores, Azores" (apparently Delgada Point of the Hydrographic chart, Lat. 39° 31′ N. Long., 31° 13′ W., and not Ponta Delgada, San Miguel). Flores is one of the northwestern islands of the Azores and Delgada Pt. is its northmost point. It would therefore seem from the position in which the bottle was found that it had approached the Azores from the north or northwest. The bottle was of heavy glass and closed with a paraffined cork. It contained a Canadian postcard, offering a reward to the finder who wrote on it the time and place of finding. Set out at the same time were 99 other similar bottles and they were set out in a line from Point Lepreaux to Gulliver Hole, on the Nova Scotia Coast. A bottle set out about a mile away from the one found in the Azores was picked up on Cape Cod.

From the known drift of other bottles in the Gulf of Maine it seems probable that the bottle which was returned from the Azores passed southwestward in the Gulf of Maine and passed Cape Cod into the Atlantic and further that the bottle took about two and one half months to reach the water near Cape Cod. Without doubt the bottle encountered the "Gulf Stream" and was carried across it to its eastern and southern side as the "Gulf Stream" swings round the North Atlantic. The time taken by the bottle to go from the American coast to the Azores was probably not more than nine and one half months.

It is interesting to compare the drift of this bottle with that of one recorded in the *Toronto Daily Star,* November 1, 1920.[2]

A bottle cast into the Atlantic Ocean near Newfoundland by Sergeant D. McInnes, of Edmonton, when returning to Halifax, September, 1919, after shooting at Bisley, reached Nieuport, Belgium, last August.

This bottle undoubtedly traveled in the western and northern edge of the "Gulf Stream" and took about the same time to cross as the other bottle.

The drift of these bottles may be further compared with the drift of derelicts[3] in the North Atlantic and especially with the well-known drift of the schooner *Fannie E. Wolston* which was adrift for at least two and a half years and was observed over thirty times. She was observed at sea in Lat. 36° N., Long. 74° W. (northeast of Cape Hatteras) on December 15, 1891, and four times afterwards on her way across the Atlantic in an easterly direction until she reached Lat. 35° N. and Long. 39° W. on June 13, 1892, having drifted in the six months about four fifths of the way from the American coast to the Azores. After reaching this point she circled in the Sargasso Sea and returned by a southern route to the American coast.

James W. Moor

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AN ADJUSTABLE EMBOUCHURE

To the Editor of Science: I am much interested in Professor Barus's article on "An Adjustable Embouchure" (which the types have made "embouchuer") appearing in Science for January 14, which has just come to hand. I think he did not see my instrument, exhibited at the meeting of the National Academy of Sciences and at the meeting of the American Physical Society in 1919, which I less modestly called "an artificially played brass instrument," and which I claimed worked exactly upon the principle of the human lips. except that it lacked their softness. In it a light piston, like a safety valve, with mass like the lips, was lifted from its seat by the air pressure, letting a puff of air into the wind instrument, while the potential energy (elasticity of the lips) was furnished by a wire under adjustable tension. The pulse being reflected at the mouth of the horn (see my paper in *Proc. Nat. Acad. Sci.,* July, 1919) comes back, and if it arrives in the right place,

[2] For this citation the writer is indebted to Miss Rigby of the staff of the Atlantic Biological Station.

[3] "Wrecks and Derelicts in the North Atlantic Ocean," 1894, U. S. Hydrographic Office.

the vibration is maintained. It also plays under water!

I have written out the theory, which under a certain assumption, shows that the sound can not be simple harmonic, though periodic. Pursuing the subject farther, I find that the problem leads to an integro-differential equation of a new type, and non-linear. Being in Paris in the summer of 1919 I wrote it out in French, hoping to present it to the Académie des Sciences, but took the precaution to show it to M. Hadamard. When he saw it he threw up his hands and exclaimed, "Vous avez résolu cela?" I replied, "Non, mais je l'ai posé," bearing in mind one of his papers where he had said that a problem was half solved when it was "bien posé." I thought I deserved some credit for that. So there it rests, half (or less) solved. If any of your readers think they can solve it, I am willing to divide the profits, or κῦδος, with them.

I am also indebted to Professor Barus for the word "siffling," which I had thought a Gallicism, but find that it is used by Chaucer.

ARTHUR GORDON WEBSTER
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VARIATION IN TARAXACUM

TO THE EDITOR OF SCIENCE: Since several species of *Taraxacum* are parthenogenetic and at the same time highly variable they have looked like tempting material for the study of certain phases of genetics. Moreover their "polymorphy," as well as that of other parthenogenetic plants, has served as a partial basis for well-known attempts to explain parthenogenesis as due to hybridization.

As a matter of fact the degree of leaf dissection is correlated with the age of a given rosette. The typical seedling leaf in both of our common species (*T. vulgare*, gray-fruited, and *T. lævigatum*, red-fruited) tends to be entire and smooth, with the plant producing more dissected, and often more hairy, leaves as it grows older. This would have been obvious to students of the genus but for the confusing fact that smooth, entire leaves are often found on very old roots. If such cases are examined, however, it will be found that the apparently juvenile leaves are borne on multicipital branches of tender age.

It is of course well known that the vigorous production of blossoms after the second year causes a radial splitting of the root crown in seedling plants and the production of several daughter rosettes upon the parent root. This cleavage may extend through the length of the root and produce a number of distinct individuals, but in any case the daughter rosettes repeat the history of the parent seedling rosette, so far as leaf characteristics and blooming habits are concerned. If the newly split crown has been buried, the daughter rosettes will be produced at the end of typical rhizomes, often as much as six inches in length. Subsequent pressure renders these rhizomes quite root-like.

The above considerations clarify the interesting results of a culture experiment reported by Stork[1] It is, moreover, not unprofitable from the standpoint of taxonomy to inspect the average herbarium collection of *Taraxaca* while bearing in mind the correlations just pointed out.

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SCIENTIFIC BOOKS

Pharmaceutical Botany, A Text-book for Students of Pharmacy and Science. Third Edition. By HEBER W. YOUNGKEN, A.M., M.S., Ph.M., Ph.D., Professor of Botany and Pharmacognosy, Philadelphia College of Pharmacy. P. Blakiston's Son & Co., Philadelphia. 1921. Pp. xix + 479. 238 illustrations and glossary.

This third edition of Dr. Youngken's excellent text-book has all the satisfactory points of the two preceding editions together with an enhanced value to teachers of the subject on account of the extensive improvements made in it. By reason of its adoption as a text in many academic institutions in addition to its very general use in the pharmacy schools, the author has followed the tendency already expressed in the second edition of making it more suitable for general botanical

[1] *Bull. Torr. Bot. Club*, 47: 199–210, 1920.

courses. The book is concise in its presentation of the subject and logical in its arrangement, it supplies exactly the need for a text in a short semester course in botany. It also lends itself well to expansion, as the reviewer has used the earlier editions, by means of supplemental lectures on the evolutionary development of plants, genetics, etc., and laboratory exercises.

This new edition has an increase of ninety pages and forty-three new illustrations have been inserted; adequate illustration is a most important feature in a scientific text-book. Chapter I. has been greatly extended so as to cover the chief methods of microtechnique. This is a practical aid to the student if a laboratory course is given in conjunction with the text-book work. Chapters II. and III. dealing with the alternation of generations and the life histories of the fern and pine, are essentially the same as in the preceding editions except that the illustrations are better, especially the reproductions of the microphotographs of sections. In Chapter IV. the treatment of the angiosperms, with *Erythronium* as a type, is expanded and additional illustrations inserted. Chapter V. entitled Vegetable Cytology is comprehensive to a degree. Mitosis and the morphology of a plant cell are adequately presented as well as a discussion of the modes of reproduction in plants. The section dealing with non-protoplasmic cell contents is especially detailed for such a general text and treats admirably the principal plant products as sugars, starches, glucosides, alkaloids, oils, gums, pigments, etc., with short tests for identifying specific substances as cocaine, veratrine, asparagine, caffein, salicin, hesperidin, etc., which supplies the needs of pharmacy students in this respect and emphasizes the economic importance of many plants for the general student.

While in its use as a general text it may be rather deficient in the presentation of botanical physiology an attempt is made in this edition to overcome this criticism by a discussion, under the head of Protoplasm and its Properties, of the elements of organic function. Various tropisms are considered and reference is made to the recent work of Steckbeck on sensitive plants. Chapters VI. and VII. represent the histological and anatomical section of the book. The treatment of plant tissues and organs, as roots, stems leaves, flowers, is thorough and complete, and while remniscent of that old and useful general text, Gray's Lessons in Botany, is quite modern in its presentation. The concluding Chapters VIII. and IX. cover the subjects of taxonomy and ecology. The latter subject is presented in four pages but the chapter on classification is very complete with regard to plants used in materia medica. Only the medicinal plants of each order or family are considered, the official name, the botanical name, the part of the plant used and the habitat being given in each case. The illustrations of these plants are especially helpful. If, however, the book is used as a general text a regular manual or flora could easily be substituted as a reference for that portion of the course in lieu of this pharmaceutical taxonomy.

Although the book was primarily written for pharmacy students, and is used by the reviewer for such students, the broad scope and the diverse phases of botanical science presented in a convenient and orderly manner commend it equally well to teachers as a general text.

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SPECIAL ARTICLES

TWO LIMESTONE FORMATIONS OF THE CRETACEOUS OF TEXAS WHICH TRANSGRESS TIME DIAGONALLY

Some thirty-five years ago the existence of two great series of Cretaceous formations in the Texas region was pointed out by the writer, and it was shown that each of these—the Gulf and the Comanche Series—represented a cycle of sedimentation which culminated in relatively deeper water formations, known now as the Edwards Limestone and Austin Chalk respectively.

Observations of the past few years during

which I have been permitted to return to Texas and renew the studies of these formations, have shown that the lithologic aspect of each instead of representing definite and fixed time positions in their horizontal extent, moves upward through the geological column as it is respectively traced east or west from the locality of the standard section in Central Texas, as is shown on the accompanying diagram table. The position of the Austin Chalk ascends to the eastward from Central Texas towards northeast Texas and Arkansas, where it is known as the Anona Chalk, and Alabama, where it is called the Selma.

The Austin Chalk in the course of this ascent practically continues from the Niobrara to the Ripley or near Fox Hills stage of the time column, and is accompanied by corresponding changes in its fauna. This transgression of the Austin Chalk has recently been noted by my associate Mr. J. E. Brantly in a recent report on the oil fields of Alabama, published by the State Geological Survey of that state.

Recently while studying the geology of the Fort Stockton Country in Pecos County, Texas, the writer observed a similar instance of transgression by the Edwards limestone. In this instance both the lithologic and paleontologic facies of the Edwards limestone formation, which occupies a fixed position in the geologic column in Central Texas, is found to have transgressed through time diagonally until it occupies a higher and altogether different one in the vicinity of Fort Stockton, as it is traced to the westward from Austin towards the east front of the Cordilleran Ranges. This formation in both localities largely consists of cellular and semi-chalky white limestones which weathers gray and yellow, accompanied by a characteristic fauna of fossil species (Rudistes, corals, echinoderms, etc.).

In the typical Central Texas section heretofore described the Edwards limestone and its fauna occur in a definite position below the Kiamitia and Duck Creek formation. In the vicinity of Fort Stockton where it occurs as the cap rock of extensive areas, it was found with the same lithologic aspects and fauna as in Central Texas, but its stratigraphic position was found to be above the Georgetown Duck Creek and Kiamitia formations and faunas, instead of below them, as it normally occurs in the Central Texas sections.

DIAGONAL TRANSGRESSION OF THE EDWARDS LIMESTONE AND AUSTIN CHALK

Edwards Limestone					Time	Austin-Anona Chalk		
Locality						Locality		
Mexico	Stockton	Crockett	Austin	Fort Worth		Central Texas	N.E. Texas, Louisiana, Arkansas	Alabama, Mississippi
					Gulf Series, Navarro-(Ripley)			×
					Taylor-(Pierre)		×	
					Austin-(Niobrara)	×		
					Eagle-Ford (Benton)			
					Woodbine (Dakota)			
					Comanche-Series, Buda			
					Del Rio			
		×			Georgetown			
					Duck Creek			
					Kiamitia			
				×	Goodland			
					Walnut			
					Paluxy			
					Glen Rose			
					Trinity			

The only hypothesis I have to offer for these peculiar conditions is that during the two epochs similar conditions of depth and environment must have continued with shifting location as time progressed, but at present I can not explain why the fauna of the Austin-Anona Chalk changed with this transgression while that of the Edwards persisted.

This fact may have important bearing upon the correlation of the Texas Cretaceous sections with those of Mexico, and assist in the interpretation of the as yet but little understood formations of the latter county.

ROBERT T. HILL

DALLAS, TEXAS

THE AMERICAN MATHEMATICAL SOCIETY

THE twenty-seventh annual meeting of the society was held at Columbia University on Tuesday and Wednesday, December 28–29, with the usual

morning and afternoon sessions on each day. The attendance included 86 members. President Frank Morley occupied the chair, relieved by G. D. Birkhoff, R. G. D. Richardson, and H. S. White. The following new members were elected: Professor L. M. Coffin, Coe College; Professor I. H. Fenn, Polytechnic Institute of Brooklyn; Dr. Ludwik Silberstein, Eastman Kodak Company; Dr. W. L. G. Williams, Cornell University. One hundred and twenty-one applications for membership were received.

At the annual election the following officers and other members of the council were chosen: President, G. A. Bliss; vice-presidents, F. N. Cole and Dunham Jackson; secretary, R. G. D. Richardson; treasurer, W. B. Fite; committee of publication, E. R. Hedrick, W. A. Hurwitz, J. W. Young; members of the council to serve until December, 1923, T. H. Gronwall, O. D. Kellogg, Florence P. Lewis, A. D. Pitcher.

The total membership of the society is now 769, including 87 life members. The total attendance of members at all meetings, including sectional meet- of papers read was 211. The number of members attending at least one meeting during the year was 280. At the annual election 189 votes were cast. The treasurer's report shows a balance of $8,994.53, including the life membership fund of $7,518.87. Sales of the society's publications during the year amounted to $2,067.74. The library now contains 5,862 volumes, excluding some 500 unbound dissertations.

At the meeting of the council, Professor T. S. Fiske, as representative of the contributors to the Bôcher memorial fund, tendered the fund to the society to be held in trust and the income to be employed for the advancement of mathematical science. The trust was accepted, and a committee appointed to consider the most appropriate use to which the income of the fund could be devoted.

A committee was appointed to make the necessary arrangements for the meeting of the society to be held at Wellesley College in the summer of 1921.

The afternoon session on Tuesday was especially marked by the retiring presidential address of Professor Frank Morley, on "Pleasant questions and wonderful effects." A dinner was held at the Faculty Club Tuesday evening at which fifty members were present.

At the close of the morning session on Wednesday, Professor H. S. White, in a short address, tendered the thanks of the society to Professor Cole for his distinguished services during his twenty-five years of office as secretary of the society and editor of its *Bulletin*.

The following papers were read at the annual meeting:

C. E. Wilder: "Einstein's four-dimensional space is not contained in a five-dimensional linear space."

J. L. Walsh: "On the convergence of the Sturm-Liouville series."

Anna M. Mullikin: "Certain theorems concerning connected point sets."

A. R. Schweitzer: "On homogeneous functions as generators of an abstract field."

A. R. Schweitzer: "The concept of an iterative compositional algebra."

Joseph Lipka: "Transformations of trajectories on a surface."

Harry Langman: "Conformal transformations of period n and groups generated by them."

O. E. Glenn: "On a new treatment of theorems of finiteness (second paper)." (Preliminary report.)

J. E. Rowe: "The efficiency of projectile and gun."

S. D. Zeldin: "On the structure of finite continuous groups with one two-parameter subgroup."

S. D. Zeldin: "On the structure of finite continuous groups with a finite number of exceptional infinitesimal transformations."

H. S. Vandiver: "On quadratic congruences and the factorization of integers."

E. V. Huntington: "A mathematical theory of proportional representation."

H. M. Morse: "Recurrent motions of the discontinuous type."

Frank Morley: presidential address: "Pleasant questions and wonderful effects."

Edward Kasner: "Properties of orbits in the general theory of relativity."

Edward Kasner: "The solar gravitational field in finite form."

Norbert Wiener: "The average of an analytic functional."

Norbert Wiener: "The average of a functional."

Norbert Wiener: "Further properties of the average of a functional."

Gillie A. Larew: "The Hilbert integral and Mayer fields for the problem of Mayer in the calculus of variations."

R. M. Mathews: "Generalizations of the classical construction of the strophoid."

W. A. Hurwitz: "Some properties of methods of evaluation of divergent sequences."

W. C. Graustein: "Parallel maps of surfaces."

J. H. M. Wedderburn: "On the maximum value of a determinant."

J. H. M. Wedderburn: "On the automorphic transformation of a bilinear form."

J. W. Lasley, Jr.: "Some special cases of the flecnode transformation of ruled surfaces."

R. G. D. Richardson: "The theory of relative maxima and minima of quadratic and hermitian forms and its application to a new foundation for the theory of bilinear forms. First paper: Equivalence of pairs of bilinear forms."

J. S. Taylor: "The analytic geometry of complex variables with some applications to function theory."

C. H. Forsyth: "The value of a bond to be redeemed ultimately, both principal and interest, in equal installments."

C. H. Forsyth: "Valuation of bonds bought to realize a specified rate of interest assuming the amortizations to accumulate at a savings bank rate."

Einar Hille: "Zeros of Legendre functions."

W. B. Carver: "Systems of linear inequalities."

J. L. Coolidge: "Differential geometry of the complex plane."

C. L. E. Moore: "Note on minimal varieties in hyperspace."

I. J. Schwatt: "Independent expressions for the Bernoulli numbers."

I. J. Schwatt: "Relations involving the numbers of Bernoulli and Euler."

I. J. Schwatt: "Independent expressions for Euler numbers."

I. J. Schwatt: "Independent expressions for the Euler numbers of higher order."

I. J. Schwatt: "Summation of a type of Fourier's series."

F. W. Owens: "On the projectivity assumption in projective geometry."

R. W. Burgess: "On certain simple skew frequency curves."

G. M. Robison: "Divergent double series and sequences."

G. D. Birkhoff: "An extension of Poincaré's geometric theorem."

J. L. Walsh: "On the location of the roots of polynomials."

Abstracts of the papers will appear in the March issue of the society's *Bulletin*.

The fifteenth western meeting of the society was held at Chicago on December 29–30, in connection with the meeting of the American Association for the Advancement of Science. The next regular meeting of the society will be held at New York on February 26.

R. G. D. RICHARDSON,
Secretary

THE AMERICAN ASTRONOMICAL SOCIETY

THE twenty-fifth meeting of the society was held in affiliation with the American Association for the Advancement of Science at the University of Chicago on December 28–30, 1920. In common with other societies there was a full attendance of members, about sixty astronomers being present, and there were many interesting and valuable papers. Sessions were held on three days in the Ryerson Physical Laboratory, but without doubt the most important astronomical communication was presented at the joint session with the American Physical Society and the Optical Society of America, when Professor A. A. Michelson announced the striking success of his interferometer as applied at Mt. Wilson in the direct measure of the diameter of the star *α Orionis*.

The members attended a joint dinner at the Quadrangle Club with the members of the mathematical societies, and there was the usual profitable intercourse with other men of science made possible at these large gatherings.

As this was not the annual meeting of the society, there were no particular matters of business to be considered. A dozen new members were elected, bringing the total membership to something more than three hundred and fifty.

Following are the titles of the papers, abstracts of which will be regularly published in *Popular Astronomy*.

Note on the comparison of spectral types determined at Harvard and Mount Wilson: W. S. ADAMS and A. H. JOY.

Evidence regarding the giant and dwarf division of stars afforded by recent Mount Wilson parallaxes: W. S. ADAMS and A. H. JOY.

Additional evidence on changes of wave-length which are progressive with stellar type: SEBASTIAN ALBRECHT.

Sun-spot intensities as components of a Fourier series: DINSMORE ALTER.

The association of hydrogen lines with the "invariable" K line in the spectrum of κ Draconis: R. H. BAKER.

Observations of the present disappearance of the rings of Saturn: E. E. Barnard.

Probable explanation of the apparent elongation of the Gegenschein: E. E. Barnard.

Comments on the spectra of Nova Cygni No. 3 and Nova Aquilae No. 3: S. B. Barrett and E. B. Frost.

The system of magnetic forces during the solar eclipse of May 29, 1919: Louis A. Bauer.

The light-curve of Nova Cygni No. 3: Leon Campbell.

Some new methods for double star orbits: G. C. Comstock.

An instrumental source of doubling of the emission lines in the spectrum of γ Cassiopeiae: R. H. Curtiss.

The search for the gravitational effect predicted by Einstein for solar wave-lengths: Ralph E. Delury.

Second note on the displacements of spectrum lines at the limb of the sun: Ralph E. Delury.

Further note on fluctuations in the moon's longitude in relation to meteorological variations: Ralph E. Delury.

Some measurements of the displacements of spectrum lines in the penumbrae of sun-spots: Ralph E. Delury and John L. O'Connor.

Notes on atmospheric conditions at Tucson, Arizona: A. E. Douglass.

Stellar parallaxes determined at the Dearborn Observatory: Philip Fox.

On some "irreconcilables" among stellar radial velocities: E. B. Frost.

Sundry spectroscopic binaries: E. B. Frost and S. B. Barrett.

Notes on Nova Cygni No. 3: W. E. Harper.

The spectroscopic orbit of Boss 5070: W. E. Harper.

The photographic light-curve of Nova Cygni No. 3: F. Henroteau.

The North America nebula: F. Henroteau.

Recent photographic observations of several well-known novae: C. O. Lampland.

Motions of the prominence of October 8, 1920: O. J. Lee.

Progress in the reduction of the Kapteyn zone at north declination 45°: O. J. Lee.

The Des Moines municipal observatory: D. W. Morehouse.

On the age of the stars: F. R. Moulton.

Orbit of the spectroscopic binary τ Cygni (period 3 h. 25 m.): J. Paraskevopoulos.

Objective prism spectra of Nova Aquilae No. 3 and Nova Cygni No. 3: J. A. Parkhurst and E. B. Frost.

The diameter of α Orionis by Michelson's interferometer methods: F. G. Pease.

The intensity distribution in tpyical stellar spectra: H. H. Plaskett.

The spectroscopic orbit and dimensions of Z. Vulpeculæ: J. S. Plaskett.

A wide-angle astronomical doublet: Frank E. Ross.

The Kostinsky effect: Frank E. Ross.

Comparative tests of the 100-inch and 60-inch reflectors: F. H. Seares.

Secular motion of perihelion due to the dragging of a compressible aether: L. Silberstein.

On some new variable stars: Joel Stebbins.

Spectrographic observation of rotating spiral nebulæ: V. M. Slipher.

Photographic distortion on eclipse plates and the Einstein effect: Frederick Slocum.

Chronographic measurement of small time intervals: R. Meldrum Stewart.

Recording of wireless time signals: R. Meldrum Stewart and J. P. Henderson.

Circle flexure of the Ottawa meridian circle: R. Meldrum Stewart and C. C. Smith.

Progress of the measurement of the Hussey double stars: G. Van Biesbroeck.

Note on the effect of the barometric gradient on meridian observations: C. C. Wylie.

On the probable reason why certain periodic comets have not been found on their predicted returns: Jessica M. Young.

The spectroscopic orbit of ο Draconis: R. K. Young.

Joel Stebbins,
Secretary

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